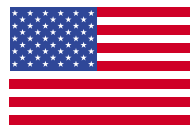


Bently Nevada systems don't cost ... they pay

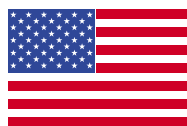


A U.S. petrochemical facility connected its Bently Nevada machinery protection system to its Distributed Control System (DCS). If one of their machines experiences high vibration amplitudes, the Operators are alerted to this through the DCS, and they contact the mechanical group for decision-making on what steps to take. The mechanical group uses a Bently Nevada machinery management system to analyze the problem, and take action if needed. An example of this took place when the 4th stage of the charge gas compressor experienced high vibration amplitudes. The Bently Nevada Decision Support™ “expert” system diagnosed the problem as an instability due to fluid whirl, and the orbit plot displayed by the system confirmed this. By adjusting the process and cooling the 4th stage case, the customer was able to keep the ethylene unit running a few more weeks until their scheduled outage. According to the customer, **this saved approximately USD 2,500,000 in production.**



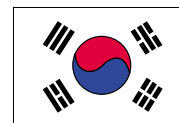
A Brazilian refinery was experiencing broken shafts, impeller damage, and heavily damaged bearings approximately every two months on three turbine-driven pumps used to remove the fluid left in the bottom of a cracking tower. The only feedback Operators had was the flow level in the header and the fluid level in the cracking tower. Pumping requirements were handled by two of the three pumps, with the last one used as a spare. After the installation of a Bently Nevada machinery

management system, Operators noticed that, during specific process conditions, the pumps began to vibrate excessively. The Operator called Maintenance and asked them to investigate. Maintenance personnel logged onto the Bently Nevada system from their desk and discovered that most of the vibration was at the pump blade passing frequency. They concluded that the problem was probably caused by a lack of flow. Further evaluation revealed that load was never equally distributed between the two pumps they were using. Suspecting unequal flow distribution, Operators varied the pump speed via the turbines and were able to reduce overall vibration. Even though the Operator did not look at dynamic data during this operation, maintenance personnel reviewed the machinery management system's plots and confirmed that the fundamental cause was poor flow management. The customer reports that the pumps have been in operation for 16 months now, with no reported failures. **The result is savings of over USD 100,000.** When this savings is added to other savings from averted failures, the machinery management system has paid for itself several times over.



Almost immediately after installation, a Bently Nevada machinery management system played a key role in preventing a 7 to 10 day shutdown at a U.S. petrochemical facility. The particular incident involved a coupling attaching a 7000 hp ac synchronous motor to a twin-screw extrusion unit. Just nine days after the machinery

management system was turned on, vibration increased to the Alert level. Nine days later, it increased to the Danger level, calling for immediate action. With access to strategic information via modem, management was quickly able to identify the problem and made the decision to open the machine and remove the coupling. Three of the six coupling hub retainer bolts had broken, and the remaining three bolts had been sheared off. If there had been a failure, much more of the machine would have been damaged, which might have meant a bent or broken extruder shaft or motor shaft. **Either scenario would have cost the company in excess of USD 750,000.**



A South Korean cement manufacturer used a Bently Nevada machinery management system to identify significant bearing wear on the first stage of a kiln's main speed reducer. The system was credited with helping plant engineers identify the problem before the machinery failed, thereby allowing them to order a replacement part and schedule maintenance. They estimate this advance notice saved 24 hours of unscheduled downtime, **helping save USD 440,000 worth of production** that would otherwise have been lost. In the first year it was installed, the machinery management system was also instrumental in other machine saves and was credited with preventing 80 hours of unscheduled downtime, **saving the plant approximately USD 1,500,000 more.** 